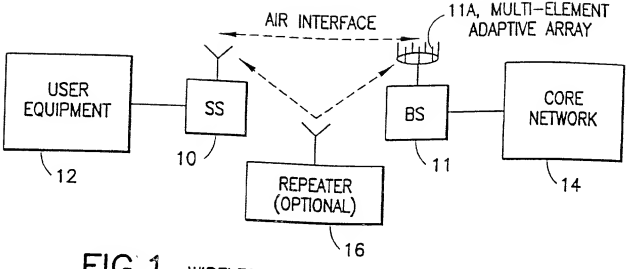


FIG.1 WIRELESS ACCESS REFERENCE MODEL

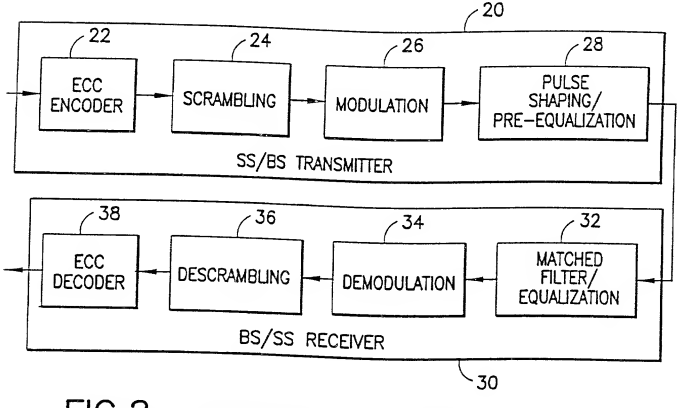


FIG.2 PHY REFERENCE MODEL SHOWING DATA FLOW

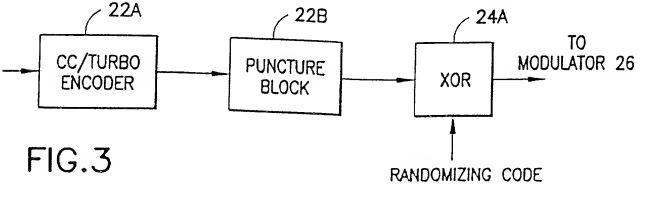


FIG.3

	MODULATION AND CHANNEL CODING		
PARAMETER	QPSK w/R=4/5 CODING (1.6 BITS/SYM)	16-QAM w/R=4/5 CODING (3.2 BITS/SYM)	64-QAM w/R=4/5 CODING (4.8 BITS/SYM)
RF CHANNEL BANDWIDTH	3.5 MHz	3.5 MHz	3.5 MHz
CHIP RATE	2.56 Mcps	2.56 Mcps	2.56 Mcps
COMMUNICATION CHANNEL BANDWIDTH	4.096 Mbps	8.192 Mbps	12.288 Mbps
PEAK DATA RATE	4.096 Mbps	8.192 Mbps	12.288 Mbps
CDMA CHANNEL BANDWIDTH (SF=1)	4.096 Mbps	8.192 Mbps	12.288 Mbps
CDMA CHANNEL BANDWIDTH (SF=16)	256 kbps	512 kbps	768 kbps
CDMA CHANNEL BANDWIDTH (SF=128)	32 kbps	64 kbps	96 kbps
MODULATION FACTOR	1.17 bps/Hz	2.34 bps/Hz	3.511 bps/Hz

FIG.4 HYPOTHETICAL PARAMETERS FOR A 3.5 MHz RF CHANNELIZATION

	QPSK		16 QAM		64 QAM	
NUMBER OF ELEMENTS	AGGREGATE CAPACITY (Mbps)	MODULATION FACTOR	AGGREGATE CAPACITY (Mbps)	MODULATION FACTOR	AGGREGATE CAPACITY (Mbps)	MODULATION FACTOR
1	4.096	1.17	8.192	2.34	12.288	3.511
2	8.192	2.34	16.384	4.68	24.576	7.022
4	16.384	4.68	32.768	9.36	49.152	14.044
8	32.768	9.36	65.536	18.72	98.304	28.088
16	65.536	18.72	131.072	37.44	196.608	56.176

FIG.5 AGGREGATE CAPACITY AND MODULATION FACTORS VERSUS MODULATION TYPE AND ARRAY SIZE

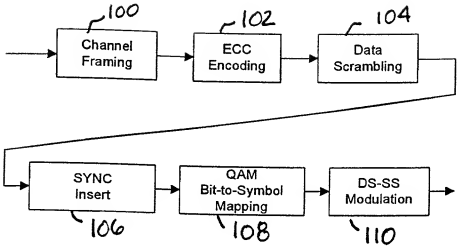


FIG. 6A

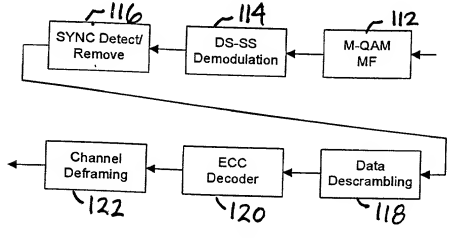
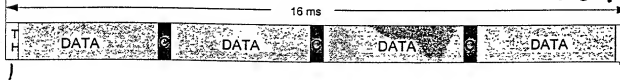


FIG. 6B

FIG. 7



HEADER TRAINING SYMBOLS

TRAIL TRAINING SYMBOLS

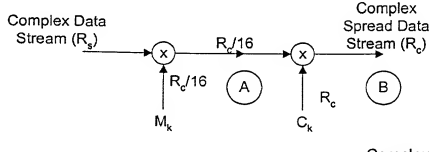


FIG. 14A

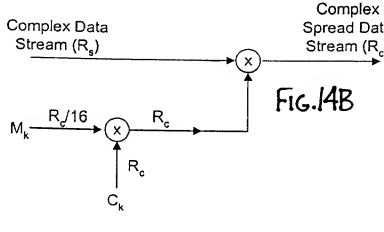


FIG. 14B

Physical Layer Frame Format Details for QPSK and 16-QAM

Frame Format for 4-QAM Modulation										
Payload Bit Rate (kbps)	Aggregate Bit Rate (kbps)	Coded Symbol Rate (ksps)	Information Bytes per Frame				Transmitted Symbols per Frame			
			Total	Training	Control	Data	Total	Training	Control	Data
32	34	21.25	68	1	3	64	340	5	15	320
64	68	42.5	136	2	6	128	680	10	30	640
128	136	85	272	4	12	256	1360	20	60	1280
256	272	170	544	8	24	512	2720	40	120	2560
4096	4352	2720	8704	128	384	8192	43520	640	1920	40960

Frame Format for 16-QAM Modulation										
Payload Bit Rate (kbps)	Aggregate Bit Rate (kbps)	Coded Symbol Rate (ksps)	Information Bytes per Frame				Transmitted Symbols per Frame			
			Total	Trainin g	Control	Data	Total	Training	Control	Data
64	68	21.25	136	2	6	128	340	5	15	320
128	136	42.5	272	4	12	256	680	10	30	640
256	272	85	544	8	24	512	1360	20	60	1280
512	544	170	1088	16	48	1024	2720	40	120	2560
8192	8704	2720	17408	256	768	16384	43520	640	1920	40960

FIG. 8A

Symbol Rate	Header-Training Symbols	Header-Training Field (TH)	Tail-Training Symbols	Tail-Training Field (TT)
21.25 ksps	2	h	3	t
42.5 ksps	4	hh	6	tt
85 ksps	8	hhhh	12	tttt
170 ksps	16	hhhhhhhh	24	tttttttt
2720 ksps	256	h x 128	384	t x 128

Header and Tail Training Fields for Normal Frame Format FIG.8B

Symbol Rate	Header-Training Symbols	Header-Training Field (TH)	Tail-Training Symbols	Tail-Training Field (TT)
21.25 ksps	2	h	3	v
42.5 ksps	4	hh	6	vv
85 ksps	8	hhhh	12	vvtt
170 ksps	16	hhhhhhhh	24	vvtttttt
2720 ksps	256	hh.....h	384	vvttt.....t

Header and Tail Training Fields for Termination Frame Format FIG.8C

Normal Frame Format Stream

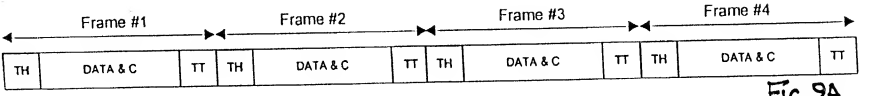


FIG. 9A

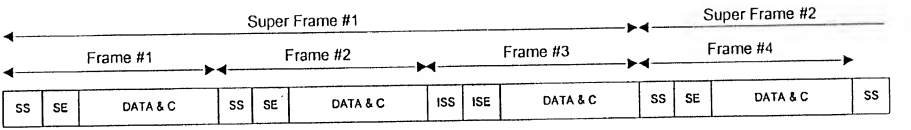


FIG. 9B

$$I = A \cdot [2 \cdot d_1 - 1]$$
$$Q = A \cdot [2 \cdot d_0 - 1]$$

FIG. 10A

$$I = A \cdot (2d_3 - 1) \begin{cases} A & d_1 = 0 \\ 3A & d_1 = 1 \end{cases}$$
$$Q = A \cdot (2d_2 - 1) \begin{cases} A & d_0 = 0 \\ 3A & d_0 = 1 \end{cases}$$

FIG. 10B

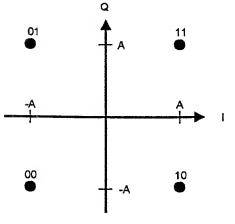


FIG. 11A

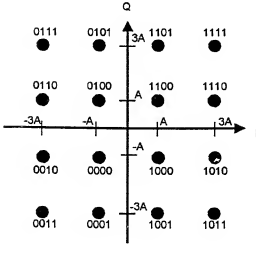


FIG. 11B

Symbol Rate	4-QAM	16-QAM
	Spacing Parameter (A)	Spacing Parameter (A)
21.25 ksps	A_0	$A_0 \cdot \sqrt{2/5}$
42.5 ksps	$A_0 \cdot \sqrt{2}$	$A_0 \cdot 2\sqrt{1/5}$
85 ksps	$A_0 \cdot 2$	$A_0 \cdot 2\sqrt{2/5}$
170 ksps	$A_0 \cdot 2\sqrt{2}$	$A_0 \cdot 4\sqrt{1/5}$
2720 ksps	$A_0 \cdot 8\sqrt{2}$	$A_0 \cdot 16\sqrt{1/5}$

FIG.12A

Symbol Rate	4-QAM	16-QAM
	Spacing Parameter (A)	Spacing Parameter (A)
21.25 ksps	A_0	$A_0 \cdot \sqrt{1/5}$
42.5 ksps	$A_0 \cdot \sqrt{2}$	$A_0 \cdot \sqrt{2/5}$
85 ksps	$A_0 \cdot 2$	$A_0 \cdot 2\sqrt{1/5}$
170 ksps	$A_0 \cdot 2\sqrt{2}$	$A_0 \cdot 2\sqrt{2/5}$
2720 ksps	$A_0 \cdot 8\sqrt{2}$	$A_0 \cdot 8\sqrt{2/5}$

FIG.12B

Symbol Rate (ksps)	Spread Factor (chips/symbol)
21.25	128
42.5	64
85	32
170	16
2720	1

FIG.13

Modulation Format	Required E_b/N_0 in dB	
	BER=10^{-6}	BER=10^{-9}
4-QAM	**6.1 dB**	**~8.5 dB**
16-QAM	**9.6 dB**	**~11.5 dB**

FIG.19

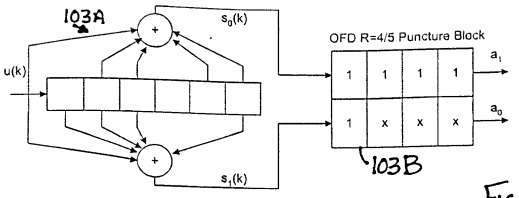


FIG.15

a_1	$s_0(0)$	$s_0(1)$	$s_0(3)$	$s_0(4)$	$s_0(6)$	$s_0(8)$	$s_0(9)$	$s_0(11)$	$s_0(12)$	$s_0(14)$	.....
a_0	$s_1(0)$	$s_1(2)$	$s_1(4)$	$s_1(5)$	$s_1(7)$	$s_1(8)$	$s_1(10)$	$s_1(12)$	$s_1(13)$	$s_1(15)$	.....

FIG.16

d_3	$a_1(0)$	$a_1(2)$	$a_1(4)$	.....
d_2	$a_0(0)$	$a_0(2)$	$a_0(4)$	.....
d_1	$a_1(1)$	$a_1(3)$	$a_1(5)$	.....
d_0	$a_0(1)$	$a_0(3)$	$a_0(5)$	.....

FIG.17

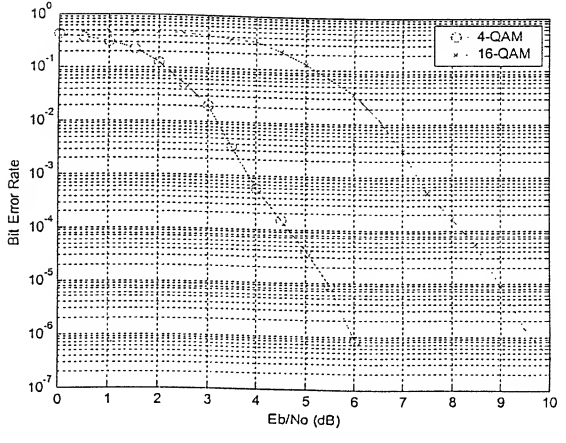


FIG.18